



## How GAC Works

### **How Granulated Activated Carbon (GAC) Works**

Granular Activated Carbon is a highly adsorbent material used to remove contamination from water. Activated carbon has been known as a miracle filter media by many researchers because of its unique ability to remove offensive tastes, odors, color, chlorine and volatile organic chemicals, pesticides, and trihalomethanes (a group of suspected carcinogens). Briefly, activated carbon acts like a sponge, with a large surface area to absorb contaminants in the water. The surface area of one pound of activated carbon is equal to 125 acres. Many scientists believe this is a result of an affinity that these chemicals have for carbon because of Van Der Waal forces. Activated carbon is the preferred treatment and method recommended by the EPA to remove a host of potentially hazardous and possibly carcinogenic chemicals in drinking water.

The data below shows partial contaminants regulated for public water systems by the Safe Drinking Water Act, and the maximum contaminant levels, source, health effects and treatment options for each.

#### **Chlorobenzene**

Source: Used as a solvent for paint and metal manufacturing. Also used in insecticides.

MCL: 0.1

Health Effect: Affects the nervous system, kidneys, and liver.

Treatment: Activated Carbon

#### **CIS-1,2 Dichloroethylene**

Source: Used as an industrial solvent in the manufacturing of dyes, perfumes, and lacquers.  
MCL: 0.07  
Health Effect: Affects liver, and nervous and circulatory systems. A probable cause of cancer.  
Treatment: Activated Carbon

### **Dibromochloropropane**

Source: Soil fumigant on soybeans, and cotton. Canceled in 1997.  
MCL: 0.0002  
Health Effect: Cancer  
Treatment: Activated Carbon

### **Dioxin**

Source: Chemical production by-product; impurity in herbicides.  
MCL: 0.00000003  
Health Effect: Affects lungs, liver, and kidney. A probable cause of cancer  
Treatment: Activated Carbon

### **Epichlorohydrin**

Source: Used in epoxy resins and coating, and in flocculants.  
MCL: 0  
Health Effect: Affects the nervous system, kidney, and liver.  
Treatment: Activated Carbon

### **Ethylbenzene**

Source: Used in the manufacture of gasoline, insecticides, and asphalt.  
MCL: 0.7  
Health Effect: Probable cause of cancer.  
Treatment: Activated Carbon

### **Ethylene Dibromide**

Source: Used as a gasoline additive and soil fumigant.  
MCL: 0.00005  
Health Effect: Affects the nervous system, kidneys, and liver.  
Treatment: Activated Carbon

### **Monochlorobenzene**

Source: Used in the manufacture of pesticides and as a metal cleaner and industrial solvent.

MCL: 0.01

Health Effect: Cancer

Treatment: Activated Carbon

### **PAHs**

Source: Coal tar coating, burnings organic matter, volcanoes, fossil fuels.

MCL: 0.0002

Health Effect: Cancer

Treatment: Activated Carbon

### **Phthalate(di(2-ethylhexyl))**

Source: PVC and other plastics.

MCL: 0.006

Health Effect: Affects skin and liver. Causes nausea. A probable cause of cancer.

Treatment: Activated Carbon

### **PolychlorinatedBiophenyts (PCBs)**

Source: Used in electrical transformers.

MCL: 0.0005

Health Effect: Affects the nervous system, kidneys, and liver.

Treatment: Activated Carbon

### **Styrene**

Source: Used in manufacturing plastic, resins and foams.

MCL: 0.01

Health Effect: Affects the nervous system. A probable cause of cancer and anesthesia.

Treatment: Activated Carbon

### **Tetrachloroethylene**

Source: Used in dry cleaning and as a degreasing agent for metals. Also used for manufacturing rubber, waxes, paints and inks.

MCL: 0.005

Health Effect: Affects the nervous system, liver, and kidneys. Causes narcosis. Irritant to the respiratory system.

Treatment: Activated Carbon

### **Toluene**

Source: Used in gasoline, paint thinners, lacquers, and adhesives.

MCL: 1

Health Effect: Cancer.

Treatment: Activated Carbon

### **Total Trihalomethanes (THM's): Chloroform / Bromoform / Bromodichloromethane / Dibromochloromethane**

Source: Formed when water containing organic matter is treated with chlorine.

MCL: 0.01

Health Effect: Affects the nervous system and muscles. A probable cause of cancer.

Treatment: Activated Carbon, Aeration, Ultra Filtration (20-90%), RO (20-90%)

### **1,1 Dichloroethylene**

Source: Used in manufacturing dyes, plastic, perfumes, paints and adhesives.

MCL: 0.007

Health Effect: Affects kidneys and liver and can cause nausea.

Treatment: Activated Carbon

### **1,1,2-Trichloroethane**

Source: Solvent in rubber products, chemical production waste.

MCL: 0.005

Health Effect: Kidney, liver, nervous system damage

Treatment: Activated Carbon

### **1,1,1-Trichloroethane**

Source: Used in manufacturing of pesticides, plastic, and metals.

MCL: 0.02

Health Effect: Affects the nervous system. Causes narcosis and probably cancer.

Treatment: Activated Carbon

### **1,2 Dichlorobenzene**

Source: Used in the manufacturing of fumigants, insecticides, waxes, resins, rubber, and asphalt.

MCL: 0.6

Health Effect: Affects lungs, liver, and kidneys.

Treatment: Activated Carbon

### **1,2 Dichloroethane**

Source: Used in the manufacturing of gasoline, paint, varnish, metal degreasers and insecticide fumigants.

MCL: 0.005

Health Effect: Kidney and liver damage can cause nausea.

Treatment: Activated Carbon

### **1,2 Dichloropropane**

Source: Used in insecticide fumigants, dry cleaning fluids and in manufacturing of resins, waxes and petroleum products.

MCL: 0.005

Health Effect: Affects lungs, liver, and kidneys.

Treatment: Activated Carbon

### **1,2,4-Trichlorobenzene**

Source: Used in herbicide production; dye carrier.

MCL: 0.07

Health Effect: Liver, kidney damage.

Treatment: Activated Carbon

### **1,4 Dichlorobenzene**

Source: Used in moth repellent, germicides, pesticides, and soil fumigants.

MCL: 0.075

Health Effect: Affects the nervous system, liver, and kidneys. A probable cause of cancer.

Treatment: Activated Carbon

### **Acrylamide**

Source: Flocculants used in sewage and wastewater treatment.

MCL: 0

Health Effect: Affects the nervous system; a probable cause of cancer

Treatment: Activated Carbon

### **Adipates**

Source: Used in synthetic rubber, food packaging, cosmetics.

MCL: 0.4

Health Effect: Decreased body weight; liver and testes damage.

Treatment: Activated Carbon, Aeration

### **Benzene**

Source: Used in fuels and as a solvent in manufacturing pharmaceuticals, plastics, pesticides and paints. Often traced to leaking underground storage tanks.

MCL: 0.005

Health Effect: Leukemia, anemia and possibly cancer.

Treatment: Activated Carbon

### **Trans-1,2Dichloroethylene**

Source: Used as an industrial solvent in the manufacturing of dyes, perfumes, lacquers, and rubber.

MCL: 0.1

Health Effect: Affects liver, and nervous and circulatory systems.

Treatment: Activated Carbon, Ozonation with UV Irradiation

### **Trichloroethylene**

Source: Used in dry cleaning and as a degreasing agent. Also used for manufacturing rubber, paints, adhesives, resins, oils and fumigants.

MCL: 0.1

Health Effect: Irritates body tissue. Affects the nervous system. A probable cause of cancer.

Treatment: Activated Carbon

### **Vinyl Chloride**

Source: Used as a plastic adhesive and refrigerant. The main component of PVC pipe.

MCL: 0.005

Health Effect: Affects the nervous system. A probable cause of cancer.

Treatment: Activated Carbon

### **Xylenes**

Source: Used in manufacturing paint, ink, petroleum and detergents.

MCL: 0.002

Health Effect: Affects the nervous system, kidneys, lungs, liver, and mucous membranes.

Treatment: Activated Carbon

### **Pesticides**

#### **Chlordane**

Source: Used on rodents, insects, birds. Restricted since 1980.

MCL: 0.04

Health Effect: Affects the nervous system, respiratory system, kidneys, and liver. A probable

cause of cancer.

Treatment: Activated Carbon

### **Endrin**

Source: Used as an agricultural insecticide.

MCL: 0.0002

Health Effect: Liver, kidneys, heart damage.

Treatment: Activated Carbon

### **Heptachlor**

Source: Agricultural insecticide. Converts to expoxide by soil and water organisms.

MCL: 0.0004

Health Effect: Affects the nervous system, respiratory system, kidneys, and liver. A probable cause of cancer

Treatment: Activated Carbon

### **Heptachlor Expoxide**

Source: Pesticide production by-product.

MCL: 0.0002

Health Effect: Affects the nervous system, respiratory system, kidneys, and liver. A probable cause of cancer.

Treatment: Activated Carbon

### **Hexachlorocyclop Entadiene**

Source: Agricultural Insecticide.

MCL: 0.05

Health Effect: Probable cause of cancer.

Treatment: Activated Carbon

### **Lindane**

Source: Agricultural Insecticide.

MCL: 0.0002

Health Effect: Affects the nervous system, respiratory system, kidneys, and liver. A probable cause of cancer.

Treatment: Activated Carbon

### **Methoxychlor**

Source: Insecticide used on apples, potatoes, and tomatoes.

MCL: 0.04

Health Effect: Affects the nervous system, respiratory system, kidneys, and liver. A probable cause of cancer.

Treatment: Activated Carbon